PAINTED SHEET METAL CORROSION TEST
(Laboratory-Simulated Arizona Proving Ground Test)

Application

This test procedure is used to evaluate the relative corrosion performance of paint coating systems applied to test panels and to car body sheet metal parts. It is designed to simulate the corrosive conditions of the Arizona Proving Ground (APG) Vehicle Accelerated Corrosion Test (CETP 00.00-R-311).

Apparatus Required

Humidity Cabinet

Blue M Engineering Company, Model AC-7502HA-1, or equivalent, with forced air circulation, temperature control of +/- 2 °C to 65 °C and relative humidity control of +/- 2 % up to 90 %.

Tank

Polyethylene or plastic-lined tank, with cover, of sufficient size and capacity to permit the test samples to be immersed in the salt solution. For 100 x 300 mm test panels a 42 L Nalgene polyethylene tank (VWR Catalog No. 60463 - 040) is adequate.

Brush

Camel hair brush, flat style (VWR Catalog No. 17215-067, or equivalent).

Materials Required

Tape

20 mm wide, 3 M No. 898 Test Tape, or equivalent.

Scribing Tools

Straight shank lathe cutting tool bit, 8 mm.
(High speed steel, Type E, ground to a 60° included angle).
Placed in a steel handle as shown in Figure 2 or a file handle as shown in Figure 3.

Tool bits and wooden file handles available from:

Production Tool Supply (Tip: E-6, Wooden Handle: 001 or L001)
12161 Telegraph Road
Redford, MI 48239
Telephone: 1-800-366-3600

Date	Action	Revisions
2001 03 20	Revised	Editorial – no technical change A. Cockman
1996 10 02		

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Carbide-tipped scriber available from:

Aircraft Specialties (#90C)
P.O. Box 98
Lapeer, MI 48446
Telephone: (810) 664-2981

G.T.S. Co (General Scriber #CM88)
12015 Telegraph Road
Redford, MI 48239
Telephone: (313) 531-7666

James Neill Tools (Eclipse Model 225)
James Neill Sheffield Ltd.
Sheffield S11 8 HB U.K.

Towels

Paper or cloth.

Sodium Chloride

Reagent grade.

Hydrochloric Acid

Reagent grade.

Sodium Hydroxide

Reagent grade.

Distilled or Deionized Water

10 ppm max dissolved solids per ASTM D 1888.

Kaolin

Powder, N.F. grade.

Stop-off Lacquer

Microshield Stop-off Lacquer, or equivalent.

Source: Pyramid Plastic
Tolber Division
P.O. Box 704
Hope, Arkansas 71802-0704
Telephone: (501) 777-3251 or 5759

Test Panels

Panels shall be prepared in accordance to FLTM BI 120-01 (for electrocoat systems) or as indicated in the applicable Engineering Materials Specification.

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Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

1. Prepare a 5 % salt solution as follows:

   Dissolve 53 g of sodium chloride per liter of distilled or deionized water. Sufficient test solution should be prepared to allow samples to be completely immersed.

   Adjust the solution pH to 6.0 - 8.0 by the addition of hydrochloric acid or sodium hydroxide.

   Replace salt solution and clean out tank when appreciable rust accumulates in the bath and deposits on the samples, or when the pH is outside of the 6.0 - 8.0 range (do not readjust the pH).

2. (Optional) In instances of extended testing or for paint-coating systems that do not resist corrosive attack at the edges, it may be necessary to mask the edges and holes of the sample parts and the holes, edges and backs of panels with an air-dry stop-off lacquer. Such masking should be denoted in the Materials Engineering Specification. Allow to dry for twenty-four hours.

3. Scribe or condition the panels or parts as indicated by the applicable Materials Engineering Specification. Hold the scriber at a 45 to 60° angle to the part or panel (see Figure 4). Scribe test panels with an "X" using the straight shank lathe cutting tool bit. When testing zinc coated steels, scribe through the coating to the substrate. A carbide tip scriber may be used for samples with narrow scribe areas or curved surfaces.

4. In order to simulate dust contamination, load a camel hair brush with a small amount of dry kaolin powder and lightly brush it on the painted surfaces to obtain a uniform, thin, dry coating. (Remove kaolin from any masked areas.)

5. Immerse the samples in the 5 % sodium chloride solution at room temperature (23 +/- 2 °C) for approximately 15 minutes.

   In those instances where it is not feasible to immerse the samples in the salt solution, a fine spray of the salt solution may be used as an alternative method.

   Note: Care must be taken to assure that the kaolin coating is not washed from the painted surfaces.

6. Remove the samples from the salt solution, drain and dry at room temperature for 1.2 - 1.3 hours.

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